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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.
08/923,461	09/04/97	LE V	RIC-96-153

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WM01/1102

EXAMINER	
SEDIGHIAN,R	
ART UNIT	PAPER NUMBER
2633	19

DATE MAILED: 11/02/01

Please find below and/or attached an Office communication concerning this application or proceeding.

Commissioner of Patents and Trademarks

Office Action Summary

Application No.	Applicant(s)
08/923,461	Viet Le et al.
Examiner	**Art Unit**
Mohammad Sedighian	2633

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136 (a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1) ☒ Responsive to communication(s) filed on *Aug 16, 2001* .

2a) ☒ This action is **FINAL.** 2b) ☐ This action is non-final.

3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11; 453 O.G. 213.

Disposition of Claims

4) ☒ Claim(s) *2-7, 9-13, 15-26, and 28-40* is/are pending in the application.

4a) Of the above, claim(s) _____ is/are withdrawn from consideration.

5) ☐ Claim(s) _____ is/are allowed.

6) ☒ Claim(s) *2-7, 9-13, 15-26, and 28-40* is/are rejected.

7) ☐ Claim(s) _____ is/are objected to.

8) ☐ Claims _____ are subject to restriction and/or election requirement.

Application Papers

9) ☐ The specification is objected to by the Examiner.

10) ☐ The drawing(s) filed on _____ is/are objected to by the Examiner.

11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved.

12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. § 119

13) ☐ Acknowledgement is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d).

a) ☐ All b) ☐ Some* c) ☐ None of:

1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____ .
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

*See the attached detailed Office action for a list of the certified copies not received.

14) ☐ Acknowledgement is made of a claim for domestic priority under 35 U.S.C. § 119(e).

Attachment(s)

15) ☒ Notice of References Cited (PTO-892)
16) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
17) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s). _____
18) ☐ Interview Summary (PTO-413) Paper No(s). _____
19) ☐ Notice of Informal Patent Application (PTO-152)
20) ☐ Other:

1. This communication is responsive to applicant's 08/16/2001 amendment in the application of Viet Le et al. for "Method and System for Modulator Multiplexing and Amplification in a Multi-Channel Plan", filed 09/04/1997. The amendment to the claim have been entered. Claims 2-7, 9-13, 15-26, and 28-40 are now pending.

2. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

3. Claims 7, 9-11, 16 and 20 are rejected under 35 U.S.C. 103(a) as being unpatentable over Otsuka et al. (US Patent No: 5,841,557) in view of Chraplyvy et al. (US patent No: 5,907,420).

Regarding claims 11 and 20, Otsuka discloses a system for amplifying (18w, 18P, fig. 15) optical signals in a set of multiple channels (ch.1(w) to ch.2i(p), fig. 15) in an operating window (odd and even numbered channels, fig. 15) of a fiber communication network (col. 1, lines 16-19), comprising: a plurality of subwindows (12N-1, 12p-1, and 12W-(2i-1), 12P-(2i-1), fig. 15); a first multiplexing unit (13-5, 13-7, fig. 15) to multiplex the optical signals into a plurality of subgroups of optical signals (col. 11, lines 56-67, col. 12, lines 1-10); a second multiplexing unit (13-1, 13-2, fig. 15); a plurality of optical fibers coupled between the first and second multiplexing unit (col. 3, lines 60-61 and fig. 15), wherein the system is configured to transport the optical signals in a uni-directional traffic (col. 19, lines 1-4, 30-40). Otsuka differs from the claimed invention in that

Otsuka does not specifically disclose the first and second multiplex units are arranged at first and second sites. However, it would have been obvious to a person of ordinary skill in the art that multiplexers such as the ones of Otsuka can be arranged at first and second sites in order to provide an apparatus to combine a plurality of signal lights into a single light for further transmission and processing. Otsuka further differs from the claimed invention in that Otsuka does not disclose a plurality of optical line amplifiers to amplify subgroups of optical signals. Chraplyvy discloses an optical communication system (col. 5, lines 20-54 and fig. 2), wherein a plurality of optical line amplifiers (col. 1, line 29 and EDFAs, fig. 2) are configured to amplify subgroups (λ_6, λ_7, and λ_1, λ_2, λ_3, and λ_5, λ_8, fig. 2)of optical signals associated with different subwindows (λ_1 λ_2, λ_3, λ_5, λ_8, and λ_6 λ_7, fig. 2) within an operating window (λ_1 to λ_8, fig. 2). Therefore, it would have been obvious to a person of ordinary skill in the art at the time of invention to incorporate optical line amplifiers such as the ones in the communication system of Chraplyvy for line amplifications in each subgroup of optical signals in the communication system of Otsuka in order to amplify optical signals of different wavelengths within different subgroups for further transmission and reception. As to claim 20, Otsuka discloses a coarse wavelength multiplex unit (13-5, 13-6, 13-7, fig. 15), and a fine multiplex unit (13-1, 13-2, 13-3, 13-4, fig. 15).

Regarding claim 7, Otsuka discloses a first coarse WDM unit (13-5, 13-7, fig. 15), and first, second, third, and fourth fine WDM units (13-1, 13-2, 13-3, 13-4, fig. 15). As to optical line amplifiers that are coupled to the fine WDM units, Chraplyvy discloses such optical line amplifiers, as discussed above in claim 1. Therefore, it would have been obvious to incorporate

optical line amplifiers that are coupled to optical fibers and to multiplexers, such as the ones of Chraplyvy for line amplifications of each subgroups of optical signals in the system of Otsuka to amplify the optical signals after they first multiplexed.

Regarding claim 9, Otsuka discloses the first multiplexing unit comprises a coarse WDM unit (col. 33, lines 29-34) and the fine WDM unit (col. 33, lines 13-15) can be added to the system in a modular fashion (fig. 7).

Regarding claim 10, Otsuka further discloses zero-dispersion shifted optical fiber for the transmission line (col. 2, lines 65-67, col. 3, lines 1-3).

Regarding claim 16, Otsuka discloses first subwindow includes a first group of channels (ch.1(w), ch. 1(p), fig. 15), the second subwindow includes a second group of channels (ch.2i-1(w), ch.2i-1(p), fig. 15), the third subwindow includes a third group of channels (ch.2(w), ch.2(p), fig. 15), and the fourth subwindow includes a fourth group of channels (ch.2i(w), ch.2i(p), fig. 15).

4. Claims 2-6, 15 and 17-19 are rejected under 35 U.S.C. 103(a) as being unpatentable over Otsuka et al. (US Patent No: 5,841,557) in view of Chraplyvy et al. (US patent No: 5,907,420) and in further view of Meli et al. (US Patent No: 5,946,117).

Regarding claims 2 and 15, the modified transmission system of Otsuka and Chraplyvy further differs from the claimed invention in that Otsuka and Chraplyvy do not disclose an operating window that comprises an erbium band of wavelengths between approximately 1520 nm

and 1561 nm. Meli discloses an optical transmission system of plurality of optical sources (28a, 28b, 28c, 28d, fig. 14) that generate optical signals of different wavelengths (col. 11, lines 1-14) in a band of wavelengths between 1530 nm and 1560 nm (col. 17, lines 1-3). Therefore, it would have been obvious to incorporate an optical signal transmission method and an optical signal transmission band of 1530 nm to 1570 nm such as the one of Meli for the modified signal transmission system of Otsuka and Chraplyvy in order to provide different transmission bands for different groups of optical signals.

Regarding claim 3, Otsuka discloses first subwindow includes a first group of channels (ch.1(w), ch. 1(p), fig. 15), the second subwindow includes a second group of channels (ch.2i-1(w), ch.2i-1(p), fig. 15), the third subwindow includes a third group of channels (ch.2(w), ch.2(p), fig. 15), and the fourth subwindow includes a fourth group of channels (ch.2i(w), ch.2i(p), fig. 15).

Regarding claims 4 and 17, Otsuka discloses a plurality of different signal light transmission sections in plurality of different group of wavelengths. Meli disclosed sources that generate respective optical transmission signal in a plurality of different wavelengths within a transmission band of 1530 nm to 1560 nm. Therefore, it is obvious to incorporate a first range of wavelengths approximately between 1530 to 1536 nm, a second range of wavelengths approximately between 1538 to 1543 nm, a third range of wavelengths approximately between 1547 to 1553 nm, and a fourth range of wavelengths approximately between 1555 to 1561 nm, for the different groups of signal light transmission sections in the modified transmission system of Otsuka and Chraplyvy.

Regarding claim 5, Otsuka discloses an operating window of sixteen channels (ch.1(w) to ch.2i(p), fig. 15), and subgroups of four channels (odd numbered channels, fig. 15).

Regarding claims 6 and 19, the combination of Otsuka, Chraplyvy and Meli discloses an optical transmission system as discussed above in claims 4 and 17. Claim 6 and 19 require similar limitation as recited in claims 4 and 17 above. Therefore, claims 6 and 19 are rejected for the same reasons as recited in claims 4 and 17.

Regarding claim 18, the combination of Otsuka, Chraplyvy and Meli discloses an optical transmission system as discussed above in claim 17. Otsuka discloses fine multiplexing (13-1, 13-2, 13-3, 13-4, fig. 15) of optical signal for a first to fourth groups of channels to individual channels (ch.1(w) to ch.2i(p), fig. 15).

5. Claims 12 and 21-25 are rejected under 35 U.S.C. 103(a) as being unpatentable over Otsuka et al. (US Patent No: 5,841,557) in view of Chraplyvy et al. (US patent No: 5,907,420) and in further view of Baker (US Patent No: 5,452,124).

Regarding claims 21 and 23, the modified optical signal transmission system of Otsuka and Chraplyvy further differs from the claimed invention in that the modified system of Otsuka and Chraplyvy does not disclose that the first and the second multiplexing units are arranged at first and second sites. However, Baker discloses a unidirectional amplification for bi-directional transmission system using wavelength division multiplexing (figs 2, 8), wherein optical multiplexers (203, fig. 8) are located at first and second sites (col. 1, lines 61-64). Therefore, it

would have been obvious to incorporate the multiplexers of Otsuka at first and second sites, such as the ones in the system of baker in order to have a different multiplex signal transmission configuration depending upon the transmission distance and the wavelength chosen for signal transmission.

Regarding claim 22, Otsuka discloses a plurality of optical transmission paths (fig. 15) that are comprised of zero-dispersion shifted optical fibers (col. 2, lines 65-67, col. 3, lines 1-3).

Regarding claims 12 and 24, Otsuka differs from the claimed invention in that Otsuka does not disclose a first to fourth optical line amplifiers optically coupled along the optical fibers. Chraplyvy discloses optical line amplifiers (EDFAs, fig. 2) that are connected to optical fibers for amplification of subgroups of optical signals, as discussed above in claim 1. Therefore, it is obvious to incorporate a first to fourth optical line amplifiers such as the ones in the system Chraplyvy for each optical line in the first to fourth subgroup of optical signals in multiplex system of Otsuka to provide a plurality of different multiplexed amplified optical signals. The combination of Otsuka and Chraplyvy further differs from the claimed invention in that Otsuka and Chraplyvy do not disclose first and third optical fibers and line amplifiers pass optical signals traveling in a first direction and second and fourth optical fibers and line amplifiers pass optical signals in a second direction opposite to the first direction. Baker discloses a bi-directional transmission system (fig. 8) that comprised of a plurality of different optical signal transmission channels (TX_1, TX_2, fig. 8) located at different sites (A, B, fig. 8), wherein optical signals are multiplexed (203, fig. 8), amplified (401, 403, fig. 8), and transmitted in a first and a second

directions. Therefore, it is obvious to a person of ordinary skill in the art to multiplex optical signals traveling in a first direction or to demultiplex optical signals in a second direction opposite of the first direction, such as the ones of Baker in the modified communication system of Otsuka and Chraplyvy to provide a bi-directional optical multiplex transmission system.

Regarding claim 25, Baker discloses multiplexing (203, fig. 8) optical signals in the set of multiple channels (TX_1, TX_2, fig. 8), and demultiplexing (201, fig. 8) optical signals into a second subgroup of optical signals (RX_1, RX_2, fig. 8). Therefore, it is obvious to incorporate a method of multiplexing and demultiplexing such as the one of Baker in the system of Otsuka for multiplexing optical signals into a first and third subgroup of optical signals and demultiplexing the optical signals into a second and fourth subgroups of optical signals in order to transmit and receive optical signals of different wavelengths at one site in a communication system.

6 . Claims 13, 26, and 28 are rejected under 35 U.S.C. 103(a) as being unpatentable over Otsuka et al. (US Patent No: 5,841,557) in view of Chraplyvy et al. (US patent No: 5,907,420) and in further view of Onaka et al. (US Patent No: 5,886,804).

Regarding claims 13, 26, and 28, the modified system of Otsuka and Chraplyvy further differs from the claimed invention in that the modified system of Otsuka and Chraplyvy does not disclose that optical line amplifier includes a dispersion compensating device. Onaka discloses an optical multiplex transmission system (fig. 1) that is comprised of a plurality of optical signals (col. 2, lines 12-13 and fig. 1) that are multiplexed (3, fig. 1) and amplified (6, fig. 1), wherein the

optical line amplifier includes a dispersion compensating fiber (col. 2, line 42-46 and 8, fig. 1). Therefore, it would have been obvious to provide line amplifiers with dispersion compensation fibers such as the one of Onaka in the modified line amplification of Otsuka and Chraplyvy in order to provide dispersion compensation for different lines in different subgroups of optical signals to further increase the range of transmission speed and transmission distance.

7. Claims 29-40 are rejected under 35 U.S.C. 103(a) as being unpatentable over Clark (US Patent No: 6,041,152) in view of ZirngibI (US patent No: 5,550,666), or Suzuki et al. (5,786,918).

Regarding claims 29 and 35, Clark discloses a WDM system (fig. 1) for multiplexing optical signals in a set of multiple channels (col. 1, lines 1-10) within an operating window (col. 3, lines 65-67, col. 4, lines 1-3), comprising: a coarse (1, fig. 1), and a fine (6, 7, fig. 1) wavelength division multiplexing/demultiplexing unit, wherein the coarse WDM unit (1, fig. 1) demultiplexes the optical signals into subgroups (col. 3, lines 55-58, 63-64), and the fine WDM unit (6, 7, fig. 1) demultiplexes the optical signals into individual channels (col. 4, lines 2-3). Clark differs from the claimed invention in that Clark does not disclose optical line amplifiers associated with each of fine WDM units. ZirngibI discloses optical demultiplexer (col. 9, lines 40-53 and 340, 335, fig. 3) with optical line amplifiers (333_1, 333_2, fig. 3). Suzuki teaches optical demultiplexers (col. 6, lines 62-65 and 6, 402, 403, fig. 1) with line amplifiers (3, 408, 409, fig. 3). Therefore, it would have been obvious to an artisan at the time of invention to in corporate optical demultiplexers with line

amplifiers such as the one of Zirngibl, or Suzuki for the fine demultiplexers in the system of Clark in order to amplify the demultiplexed optical signals within each respective subwindow or each subgroup to enable further signal processing or signal transmission.

Regarding claims 30-31, Clark further discloses the coarse WDM unit (1, fig. 1) multiplexing the optical signals into first (1530.08-1535.29, fig. 1), second (1537.94-1543.19, fig. 1), third (1547.97-1552.77, fig. 1), and fourth subwindows (1555.50-1560.86, fig. 1).

Regarding claim 32, Clark further discloses operating window comprises sixteen channels (col. 3, lines 20-25), and the first, second, third, and forth groups of channels each have four channels (17, 18, 19, 20, fig. 2A and 26, 27, 28, 29, fig. 2B).

Regarding claim 33, Clark further discloses four fine WDM units (4, 5, 6, 7, fig. 1) multiplex the optical signals in a first (1530.08-1535.29, fig. 1 and figs. 2A, 2B) to four (1555.50-1560.86, fig. 1 and figs. 2A, 2B) subwindows.

Regarding claims 34, 36-37, 39, and 40, Clark discloses a first coarse WDM multiplex/demultiplex unit (col. 3, lines 54-57 and 1, fig. 1), and a first (4, fig. 1), a second (5, fig. 1), a third (6, fig. 1), and a fourth (7, fig. 1) fine WDM multiplex/demultiplex units for demultiplexing a first (1530.08-1535.29, fig. 1), a second (1537.94-1543.19, fig. 1), a third (1547.97-1552.77, fig. 1), and a fourth subgroups of optical signals (1555.50-1560.86, fig. 1).

Regarding claims 38, Clark discloses multiple channels in the operating window comprises sixteen channels (col. 3, lines 20-25), and the first, second, third, and forth groups of channels each have four channels (17, 18, 19, 20, fig. 2A and 26, 27, 28, 29, fig. 2B).

8. Applicant's arguments with respect to claims 1-40 have been considered but are moot in view of the new ground(s) of rejection.

Applicant in the remarks states Chraplyvy does not teach or suggest amplifying subgroups of optical signals associated with different subwindows of a plurality of subwindows using different optical line amplifiers for each subgroup. However, Chraplyvy teaches optical line amplifiers (EDFAs, fig. 2) that are configured to amplify subgroups (the multiplexed sum of λ_1 λ_2, λ_3, λ_5, λ_8, and the multiplexed sum of λ_6 λ_7) of optical signals ssociated with different subwindows (λ_1 λ_2, λ_3, λ_5, λ_8, and λ_6 λ_7, fig. 2) within an operating window (λ_1 to λ_8, fig. 2). Furthermore, during the prosecution of a pending patent application, the terms found in the claim should be given the broadest reasonable interpretation, See in re Pearson, 181 USPQ 641 (CCPA 1974).

9. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37

CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

10. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Mohammad Sedighian whose telephone number is (703) 308-9063. The examiner can normally be reached on 9:00 AM to 5:00 PM from Monday to Friday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Jason Chan, can be reached on (703) 305-4729. The fax phone number for the organization where this application or proceeding is assigned is (703) 872-9314.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 305-4700.

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